HW-FOC Communication Protocol

1. Overview

ESC sends telemetry data to DataLink vis its UART, baud rate is 19200bps, 8 bit data + 1bit stop, no parity.

2. Data Format

0	1	2	3	...	...	...	n-1	n												
Initial Byte								Final Byte												
Head of the data frame	Length of the data frame*	Version No. of the Communication Protocol	Command				Checksum-L*	Checksum-H*												
0x9B	0x16	0x01	0x02: Real-time Data	...	Payload	...	0xXX	0xXX												

* The length of the data frame doesn't contain the last 2 bytes for Checksum

* The Checksun is calculated by the value of Byte0 + Byte1+Byte2+…+Byte (n-2)

3. When the Command=0x02, the Payload is the telemetry data (/real-time data) of the ESC. The payload data has 18 bytes. When the motor is running, the telemetry data packet is sent once per 50ms.

3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10	3+11	3+12	3+13	3+14	3+15	3+16	3+17	3+18	
Packet No. -H	Packet No. -L	Input Throttle Value-H	Input Throttle Value-L	Output Throttle-H	Output Throttle-L	eRPM-H	eRPM-L	Input Voltage-H	Input Voltage-L	Input Current-H	Input Current-L	Phase Current-H	Phase Current-L	MOS Temp	Capacitor Temp	Status Code-H	Status Code-H	
0-65535		0-1024				0-65535		0-65535		+/- 32767				0-255		0-65535		
		Real value = XXXX *100/1024				Motor RPM = XXXX * 10/(gear ratio * pole pairs).		Voltage = XXXX / 10		Highest bit =0 means the positive value. Real current = XXXX / 64				Check the "ADC vs Temp" form to get the real temperature of the ESC/ Capacitor		See "Notes"		

Notes

Status Code-L

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
Capacitor overheat	MOSFET overheat	The throttle is not returned to zero.	The throttle signal is lost	NA	Over current	Input Voltage is too low	Input Voltage is too high

Status Code-H

bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
NA	Operational amplifier is abnormal in Phase A	Operational amplifier is abnormal in Phase B	Operational amplifier is abnormal in Phase C	Open circuit of lower bridge (MOSFET)	MOSFET short circuit	Open circuit of upper bridge (MOSFET)	Motor is blocked

ADC vs Temperature

ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp	ADC	Temp
241	0	240	1	239	2	238	3	237	4	236	5	235	6	234	7	233	8	232	9
231	10	230	11	229	12	228	13	227	14	226	15	224	16	223	17	222	18	220	19
219	20	217	21	216	22	214	23	213	24	211	25	209	26	208	27	206	28	204	29
202	30	201	31	199	32	197	33	195	34	193	35	191	36	189	37	187	38	185	39
183	40	181	41	179	42	177	43	174	44	172	45	170	46	168	47	166	48	164	49
161	50	159	51	157	52	154	53	152	54	150	55	148	56	146	57	143	58	141	59
139	60	136	61	134	62	132	63	130	64	128	65	125	66	123	67	121	68	119	69
117	70	115	71	113	72	111	73	109	74	106	75	105	76	103	77	101	78	99	79
97	80	95	81	93	82	91	83	90	84	88	85	85	86	84	87	82	88	81	89
79	90	77	91	76	92	74	93	73	94	72	95	69	96	68	97	66	98	65	99
64	100	62	101	62	102	61	103	59	104	58	105	56	106	54	107	54	108	53	109
51	110	51	111	50	112	48	113	48	114	46	115	46	116	44	117	43	118	43	119
41	120	41	121	39	122	39	123	39	124	37	125	37	126	35	127	35	128	33	129